studied the question on the spot, except de Saussure,¹ who was there some thirty years ago. He suggested that the swamps which extend between the water and the dry land prevented the creatures from gaining the latter and therefore from transforming. But thick rush-swamps fill only the north-western extent of the region. Then Weismann speculated upon the dismal condition of the salt-incrusted surroundings which were supposed to have hemmed in the Axolotl. This dream could apply only to Lake Texcoco, where there are none! The latest suggestion has been made by Herrera,² the professor of zoology in Mexico. He puts it categorically that the Axolotl cannot transform for want of food. Fancy the idea that overcrowding of the lakes, which are teeming with food, causes famine and at the same time produces big, oily, fat Axolotl!

The inducements to remain in the water, their birthplace, have become too strong for the larvæ to yield to their innate tendency of further development. Nothing is stunted in their bodies. On the contrary, they become to a certain extent overgrown, and the sexual organs, which anyhow in most terrestrial Urodela are active only during the temporary aquatic life, undergo their normal course of development and function. H. GADOW.

ISOMERIC CHANGE IN BENZENE DERIVATIVES.³

IN recent years, it has become realised that in many chemical reactions, isomeric changes—that is, the change of a given substance into another of identical composition, but possessing a different and under the conditions a more stable constitution—play an important part; thus, as is well known, from the salts of certain organic acids, the acid frequently cannot be obtained, but a neutral isomeride (the pseudo-acid) into which the acid changes is alone isolated. One very interesting instance of isomeric change is to be found in the process of substitution in certain benzene derivatives. As long ago as 1887, Armstrong suggested that the ready production of para-derivatives from amino- and hydroxy-aromatic compounds—anilines and phenols—was due to the formation initially of isomeric compounds in which the amino- or hydroxylic hydrogen was displaced by the substituting group. Since that date, these labile precursors (phenyl chloramines, nitramines, &c.) of the ordinary substitution products (chloro-, nitro-anilines, &c.) have been isolated in numerous cases. They can always be transformed into the stable isomeride, but this change seems to be conditioned by the presence of some other substance—the catalyst. As Armstrong has suggested, these isomeric changes are “fermentative” in character, often taking place with great facility and under the influence of minute amounts of the catalyst. Measurements of the velocity show that changes of this type are always apparently monomolecular (that is, each molecule changes *per se*); but such a result only proves that the slowest reaction is monomolecular and does not exclude the possibility of the simultaneous occurrence of other more rapid transformations, which form part of the complete change.

A most instructive example of isomeric change is found amongst diazobenzene derivatives. The diazobenzene salts are derived from the base, diazonium hydroxide, to which is now generally assigned the expression $\text{Ph.N(OH)}\equiv\text{N}$. On treatment with alkalis, this base is converted into the salts (diazotates) of an isomeric acid, to which the formula Ph.N:N.OH is given. On attempting to isolate the acid from these salts, a neutral isomeric substance (the pseudo-acid) is obtained; this is probably a phenylnitrosamine, Ph.NH.NO . In this paper, the author describes a new case of intramolecular change of a remarkably interesting kind:—Chloro- and bromo-benzene-diazonium hydroxides, $\text{C}_6\text{H}_4\text{X}_3.\text{N(OH)}\equiv\text{N}$, readily change into isomeric hydroxybenzene derivatives, $\text{C}_6\text{H}_4\text{X}_3(\text{OH}).\text{NX}\equiv\text{N}$, the hydroxyl group and one of the halogen atoms (an ortho-placed halogen atom) having exchanged positions. This change not only affords another illustration of the transference of a group from the side chain of an aromatic compound into the benzene nucleus, but further shows the tendency, which has been occasionally noticed, for an ammonium base to change into

an isomeric substance of neutral character. Under all conditions, when it is possible for the diazonium hydroxide to be present, the wandering of the hydroxyl group takes place. Thus in dilute aqueous solution of such diazonium salts as the nitrate or the hydrogen sulphate, the small quantity of diazonium hydroxide which arises from hydrolytic dissociation undergoes this change. In the presence of excess of acid, there is no hydrolytic dissociation and consequently the isomeric change does not take place. In the case of the salt of a weak acid, as the acetate, where the hydrolytic dissociation is considerable, the rate of interchange of halogen for hydroxyl is greatly increased. In the naphthalene series, this intramolecular change occurs with even greater ease and rapidity than in the benzene series.

The elucidation of the nature of the process by which halogen is eliminated from diazobenzene compounds (a reaction first observed by Meldola in the naphthalene series) has rendered possible the removal of certain errors in the statements regarding the changes undergone by diazonium compounds. Thus Hantzsch has recently stated that *s*-tribromobenzenediazonium hydroxide, $\text{C}_6\text{H}_2\text{Br}_3.\text{N(OH)}\equiv\text{N}$, changes into the corresponding phenyl nitrosamine, $\text{C}_6\text{H}_2\text{Br}_3.\text{NH.NO}$, not realising that under the conditions (presence of acetic acid) an isomeric change has taken place, bromine being eliminated.

A DAYLIGHT PHOTOMETER.

A “DAYLIGHT PHOTOMETER” described by Mr. A. H. Munsell, of Boston, Mass., is designed mainly for the comparison of the brightnesses of various coloured surfaces illuminated by daylight or artificial light. The instrument consists essentially of two “cat’s-eye” shutters placed symmetrically towards a source of diffused light. Through one of these the light falls on the coloured surface to be tested, through the other upon a standard white surface. The second shutter is then gradually closed until the resulting grey produced on the white screen just matches the coloured surface in intensity, whilst a dial connected with this shutter shows, in percentage, how much darkening has been necessary to match the coloured surface under test. The instrument has also been applied to the testing of light transmitted through coloured media. Owing to the wide variation in the sources of light used, as well as in the colour perceptions of different observers, no degree of absoluteness can be attached to the readings. As Purkinje and Dove showed, the relative brightness of two differently coloured surfaces changes as the strength of the illuminating source is altered. But although the readings of the instrument must for these reasons be interpreted with great caution, the arrangement seems capable of supplying much interesting information on the variations of colour perception under different conditions. ALBERT CAMPBELL.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—It was agreed by the senate on January 29, by a large number of *placets* to one *non-placet*, to appoint two additional demonstrators of human anatomy.

The funeral service for the late Master of Caius, Dr. N. M. Ferrers, F.R.S., took place privately in the college chapel yesterday, February 4. The public service for the late Sir G. G. Stokes, F.R.S., Master of Pembroke, is to be held in St. Mary’s Church to-day, and will be attended by a large number of members and officers of the University and representatives of learned societies.

By the will of the late Mr. F. J. Quick, of Trinity Hall, the residue of his estate, valued at some 50,000*l.*, is placed in trust for the promotion of study and research in vegetable and animal biology. The University is to draw up a scheme for the administration of the trust, wherein it shall be provided that no office or appointment paid from the income of the fund shall be held by the same person for more than three years without being thrown open for a fresh election.

The election to the Lucasian professorship, vacant by the death of Sir G. G. Stokes, will take place at noon on February 28. The electors are the heads of colleges.

Miss I. Sollas, Newnham College, has been nominated to

¹ *Verhandl. Schweizer naturforsch. Gesellsch. Einsiedeln* (1868), p. 89.

² *La Naturaleza*, and ser., vol. iii. (May, 1900).

³ Abstract of paper on “Isomeric Change in Benzene Derivatives—The Interchange of Halogen and Hydroxyl in Benzenediazonium Hydroxides.” By Dr. K. J. P. Orton. Read before the Royal Society December 4, 1902.